

## A STUDY ON THE DOSIMETRY OF IRREGULAR ELECTRON FIELDS

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***Purpose*** : Computer summation algorithms for irregular electron fields are not widely available. In this study, we measured the output factors of each electron energy and each electron cone (except  $25 \times 25$  cm<sup>2</sup> applicator) of Varian CI-1800 sn: 164 linear accelerator. The cut-out size is ranging from  $1 \times 1$  cm<sup>2</sup> to  $10 \times 10$  cm<sup>2</sup> stepped by 1 cm for  $10 \times 10$  cm<sup>2</sup> and  $6 \times 6$  cm<sup>2</sup> electron cones and  $15 \times 15$  cm<sup>2</sup> for  $20 \times 20$  cm<sup>2</sup> cone. According to the measured data, we will observed the variation of the output factors and suggest the method for irregular electron field output correction.

***Materials & Methods*** : Cut-out BSBs(Beam-Shaping-Blocks) were made of CERROBEND alloy to put into the frame of each applicator. The output was measured with 0.03cc parallel plate ionization chamber be setted at the dmax of RMI PMMA solid phantom and connected to Ionex Dosemaster 2590 electrometer. The readings were corrected with temperature, pressure and be normalized to its full open cone output.

***Results*** : For each energy and  $15 \times 15$  cm<sup>2</sup>,  $20 \times 20$  cm<sup>2</sup> electron cones, the output factors decreases rapidly when the cut-out size is less than  $5 \times 5$  cm<sup>2</sup>. For  $10 \times 10$  cm<sup>2</sup> cone, the output is not decrease when the cut-out size is larger than  $4 \times 4$  cm<sup>2</sup>. For  $6 \times 6$  cm<sup>2</sup> cone, the output is the same when the cut-out size is not less than  $3 \times 3$  cm<sup>2</sup>.

***Conclusion*** : There is no simple mathematical function just like the SAR method and Clarkson mehtod that allows us to predict the output for a given field size and electron energy. According to the results of this measurement, the output of the irregular field can be corrected by Mills method if the cutout area less than the point of curve decreasing.

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Key words: Electron beam, Cutout field output, Dosimetry